Direct comparison of single and multi-polarization SAR measurements for oil and ship observation exploiting TanDEM-X pursuit monostatic mode

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ABSTRACT

This paper investigates in the framework of maritime surveillance applications, i.e. oil spill and ship detection, the use of the satellite duo, TerraSAR-X (TS-X) and TanDEM-X (TD-X), to acquire almost simultaneously pairs of independent SAR measurements using the standard single receive antenna mode (SRA) and the experimental dual receive antenna mode (DRA). With the DRA mode switched-on along track interferometry (ATI) as well as fully polarimetric SAR (polSAR) can be accessed [1]. On the other hand, SRA mode allows acquiring only a subset of polarization channels, i.e. dual-pol, beside the ordinary single polarization.

The importance of polSAR and dual-pol data is nowadays well established in many Earth Observation applications, including maritime surveillance. However the major drawbacks that limit the use of polSAR and dual-pol SAR data in applications like oil and ship detections are the reduced swath width and azimuth resolution. Exploiting the TanDEM-X pursuit monostatic configuration during the science phase [2], it has been possible for the first time to directly compare simultaneous SAR measurements of marine slicks and targets using both single and multi-polarization data. The comparison takes into account system parameters like, signal to noise ratio (SNR) and target to clutter ratio (TCR).

REFERENCES

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